Write your name here

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Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 1 (Non-Calculator)

Foundation Tier

Thursday 2 November 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
1MA1/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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6/6/6/7/2/

Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Change 365 cm into metres.

There are 100 cm in 1 m so dividing by 100 converts centimetres to metres. To divide by 100, move the decimal point twice to the left

3.65 m

(1)

(b) Change 2.7 kg into grams.

There are 1000 g in 1 kg so multiplying by 1000 converts kilograms to grams. To multiply by 1000, move the decimal point three times to the right

2700 g

(1)

(Total for Question 1 is 2 marks)

---

2 Work out $2 + 7 \times 10$

The order of operations, BIDMAS, needs to be followed.
Multiplication is before addition so 7 × 10 = 70 then 2 + 70 = 72

72

(Total for Question 2 is 1 mark)

---

3 Solve $\frac{y}{4} = 10.5$

$$\begin{array}{r} 10.5 \\ \times \quad 4 \\ \hline 42.0 \\ {\scriptstyle 2} \end{array}$$

Multiplying both sides by 4 eliminates the 4 as the denominator on the left and gets y on its own

$y =$ 42

(Total for Question 3 is 1 mark)

---

4 Here are four numbers.

–9 –2 2 9

Write one of these numbers in each box to make a correct calculation.

$\boxed{-9} + \boxed{2} = -7$

Adding a positive number to a negative makes it less negative

(Total for Question 4 is 1 mark)

---

5 Here are the first four terms of a number sequence.

2 5 11 23

The rule to continue this sequence is

multiply the previous term by 2 and then add 1

Work out the 5th term of this sequence.

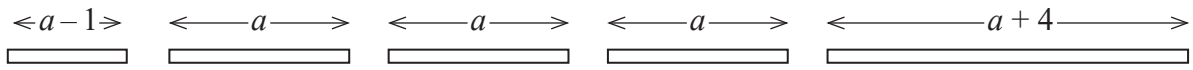
23
× 2
46 + 1

Multiplying the 4th term by 2 then adding 1 works out the 5th term

47

(Total for Question 5 is 1 mark)

6 Here are five straight rods.



All measurements are in centimetres.

The total length of the five rods is L cm.

Find a formula for L in terms of a.
Write your formula as simply as possible.

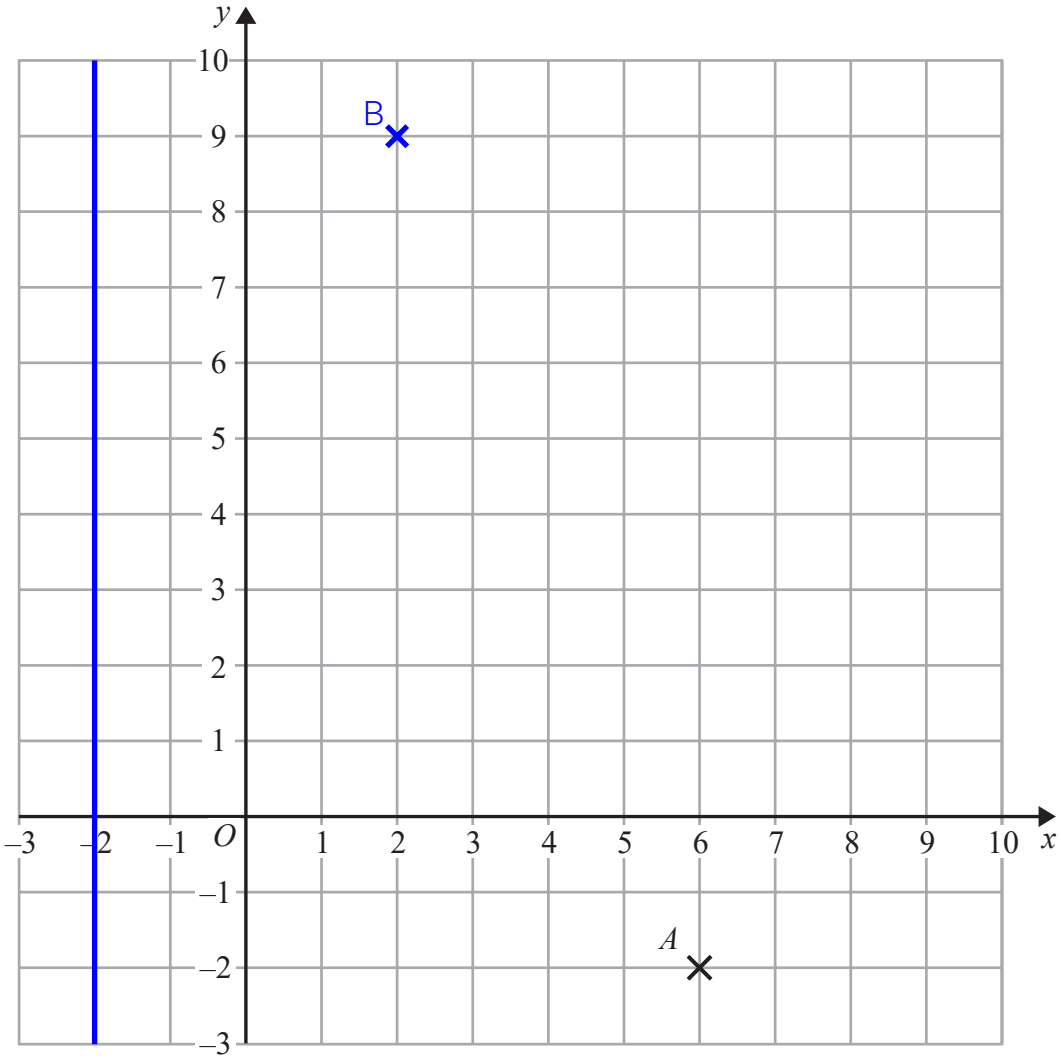
$L = a - 1 + a + a + a + a + 4$

Adding together all of the lengths of the rods. This is equal to the total length L

Collecting like terms → $L = 5a + 3$

(Total for Question 6 is 3 marks)

7



(a) Write down the coordinates of the point A.

x-coordinate y-coordinate

(6 , -2)

(1)

(b) (i) Plot the point with coordinates (2, 9).
Label this point *B*.

x-coordinate y-coordinate

(1)

(ii) Does point *B* lie on the straight line with equation $y = 4x + 1$?
You must show how you get your answer.

$4(2) + 1 = 9$ ← Substituting in the x-coordinate of 2 gives the correct y-coordinate. The point satisfies the equation so it lies on the line

Yes

.....

.....

(1)

(c) On the grid, draw the line with equation $x = -2$

Every point on the line has an x-coordinate of -2

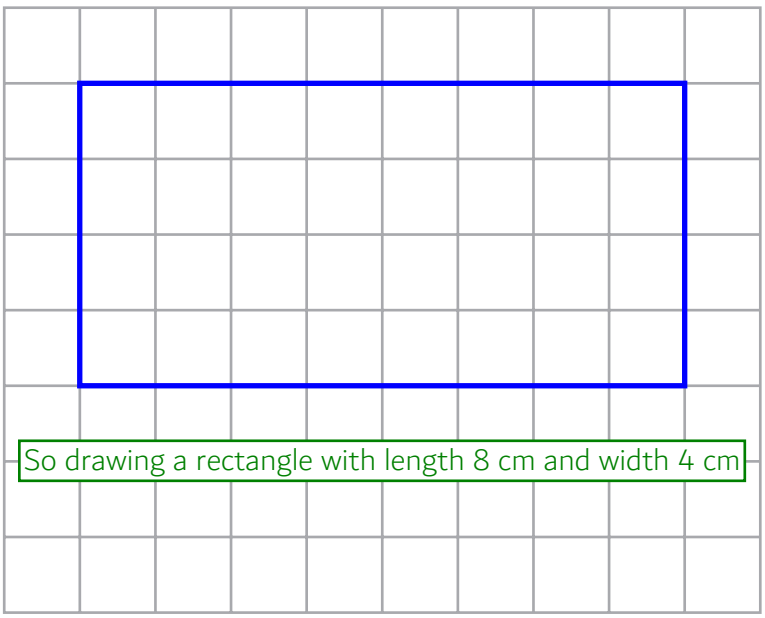
(1)

(Total for Question 7 is 4 marks)

8 The length of a rectangle is twice as long as the width of the rectangle.
The area of the rectangle is 32 cm^2.

Draw the rectangle on the centimetre grid.

1, 32
2, 16 ← Area of rectangle = length × width. Listing out the factor pairs of 32 until one of the pair is double the other. 8 is double 4 and 8 × 4 = 32
4, 8



So drawing a rectangle with length 8 cm and width 4 cm

(Total for Question 8 is 2 marks)

9 Jacqui wants to work out 3480 ÷ 5

She knows that 3480 ÷ 10 = 348

Jacqui writes 3480 ÷ 5 = 174

because 10 ÷ 5 = 2

and 348 ÷ 2 = 174

What mistake did Jacqui make in her method?

Should multiply 348 by 2 ← She has divided the 348 by 2. But dividing by half the amount doubles the result

(Total for Question 9 is 1 mark)

10 Jake and Sarah each played a computer game six times.

Their scores for each game are shown below.

Jake	10	9	8	11	12	8
Sarah	2	10	7	14	4	10

(a) Who had the most consistent scores, Jake or Sarah?
You must give a reason for your answer.

Jake as the range of his scores is lower ← A lower range means that the data is less spread out so is more consistent. Range = largest - smallest. Range of Jake's = 12 - 8 = 4. Range of Sarah's = 14 - 2 = 12

(1)

Jake played a different game 20 times.

The stem and leaf diagram shows information about his scores.

0	9
1	2 3 3 4 5
2	5 6 6 6 6 7
3	1 3 4 6 8
4	0 2 9

Key
1 | 2 represents 12 points

Jake said his modal score was 6 points because 6 occurs most often in the diagram.

(b) Is Jake correct?
You must explain your answer.

No. The mode is 26 ← 2|6 = 26 so there are 4 26s. There are no 6s

(1)

(Total for Question 10 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

11 There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.

(a) Work out the least number of adults needed in the nursery.

8, 16, 24, 32 ← Listing out the 8 times table as for every 8 children at least 1 adult is needed. 3 adults can have up to 24 children. This is not enough. 4 adults can have up to 32 children. This is the least number of adults needed for 30 children

4

(2)

2 more children join the nursery.

(b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

No, as 4 adults are needed for 32 children ← 30 + 2 = 32 children. 4 adults are still enough for 32 children

(1)

(Total for Question 11 is 3 marks)

12 Emma has 45 rabbits.

30 of the rabbits are male.
8 of the female rabbits have short hair.
12 of the rabbits with long hair are male.

A: There are 45 rabbits in total.
B: 30 of the rabbits are male.
C: 8 of the female rabbits have short hair.
D: 12 of the rabbits with long hair are male.
E: 45 - 30 = 15.
F: 30 - 12 = 18.
G: 15 - 8 = 7.
H: 12 + 7 = 19.
I: 18 + 8 = 26.

(a) Use the information to complete the two-way table.

	Male	Female	Total
Long hair	12 D	7 G	19 H
Short hair	18 F	8 C	26 I
Total	30 B	15 E	45 A

(3)

One of Emma's rabbits is chosen at random.

(b) Write down the probability that this rabbit is a female with short hair.

8 out of the 45 rabbits are female with short hair → $\frac{8}{45}$

(1)

(Total for Question 12 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

13 The total surface area of a cube is 294 cm^2.

Work out the volume of the cube.

$$6\overline{)294} = 49$$ ← A cube has 6 square faces all with the same area. Dividing the total surface area by 6 works out that the area of one of the square faces is 49 cm^2

$\sqrt{49}$ ← Area of square = length^2. So square rooting the area of the square works out that the side length of the square, and so the edge length of the cube, is 7 cm

7^3 ← Volume of cube = length^3

$$\begin{array}{r} 49 \\ \times\ 7 \\ \hline 343 \end{array}$$ ← $7^3 = 7 \times 7 \times 7 = 49 \times 7$

343 cm^3

(Total for Question 13 is 4 marks)

14 Here are two fractions.

$$\frac{7}{5} \qquad \frac{5}{7}$$

Work out which of the fractions is closer to 1
You must show all your working.

$\frac{7}{5} - \frac{5}{5} = \frac{2}{5}$ ← Subtracting 1 from 7/5 works out that the difference between 7/5 and 1 is 2/5. 5/5 is the same as 1

$\frac{7}{7} - \frac{5}{7} = \frac{2}{7}$ ← Subtracting 5/7 from 1 works out that the difference between 5/7 and 1 is 2/7. 7/7 is the same as 1

$\frac{5}{7}$ ← 2/7 is less of a difference than 2/5 so 5/7 is closer to 1

(Total for Question 14 is 3 marks)

15 There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7 : 4 : 9

Work out what percentage of the buttons in the jar are orange.

7 + 4 + 9 ← Adding all of the parts of the ratio works out that there are 20 parts in total in the ratio

$\frac{9}{20}$ ← 9 out of the 20 parts are for orange. Expressing this as a fraction

$\frac{45}{100}$ ← Multiplying both the numerator and denominator by 5 to give it as a fraction with 100 as the denominator

Percentage is out of 100. So 45/100 is 45% → 45 ..... %

(Total for Question 15 is 2 marks)

16 Berenika wants to buy 35 T-shirts.

Each T-shirt costs £5.80
Berenika does the calculation $40 \times 6 = 240$ to estimate the cost of 35 T-shirts.

(a) Explain how Berenika's calculation shows the actual cost will be less than £240

Both values are rounded up ← 35 T-shirts has been rounded up to 40 T-shirts and £5.80 has been rounded up to £6

(1)

There is a special offer.

T-shirts £5.80 each. Buy 30 or more T-shirts. Get 10% off the total cost.

(b) Work out the actual cost of buying 35 T-shirts using the special offer.

```
  5.80
 × 35
 29.00
 174.00
 203.00
 1 1
```

← Multiplying the £5.80 by 35 works out that the cost of the 35 T-shirts before the 10% off the total cost is £203

```
  2 0 3.0 0
-   2 0.3 0
  1 8 2.7 0
```

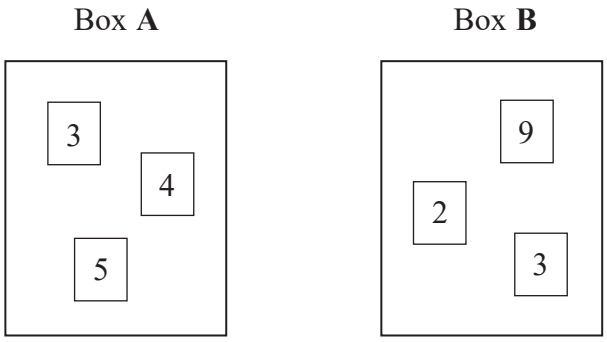
← 10% of £203 can be found by dividing the £203 by 10, which can be done by moving the decimal point once to the left to get £20.30. Subtracting the £20.30 from the £203 reduces it by 10%

£ 182.70

(4)

(Total for Question 16 is 5 marks)

17 There are 3 cards in Box **A** and 3 cards in Box **B**.
There is a number on each card.



Ryan takes at random a card from Box **A** and a card from Box **B**.
He adds together the numbers on the two cards to get a total score.

Work out the probability that the total score is an odd number.

3 + 9 = 12
3 + 2 = 5
3 + 3 = 6
4 + 9 = 13
4 + 2 = 6
4 + 3 = 7
5 + 9 = 14
5 + 2 = 7
5 + 3 = 8

Systematically listing all of the possible pairs of cards and working out the possible totals

The total scores of 5, 13, 7 and 7 are odd. This is 4 out of the 9 possible scores → $\frac{4}{9}$

(Total for Question 17 is 2 marks)

DO NOT WRITE IN THIS AREA

18 Harry, Regan and Kelan share £450 in the ratio 2 : 5 : 3

How much money does Kelan get?

450 ÷ 10 ← 2 + 5 + 3 = 10 parts in total in the ratio which represent he £450. So dividing the £450 by the 10 parts works out that 1 part of the ratio is worth £45

$45 \times 3 = 135$ ← Multiplying the value of 1 part of the ratio by the 3 parts representing Kelan works out that Kelan gets £135

£ 135

(Total for Question 18 is 2 marks)

---

19 Here is a list of ingredients for making 16 flapjacks.

Ingredients for 16 flapjacks
120 g butter
140 g brown sugar
250 g oats
2 tablespoons syrup

Jenny wants to make 24 flapjacks.

Work out how much of each of the ingredients she needs.

$\frac{24}{16} = \frac{12}{8} = \frac{6}{4} = \frac{3}{2}$ ← Expressing the 24 flapjacks as a fraction of the 16 flapjacks then simplifying by dividing both the numerator and denominator by the same amount

$120 \div 2 = 60$, 60×3

$140 \div 2 = 70$, 70×3

$250 \div 2 = 125$

$125 \times 3 = 375$

$2 \div 2$

1×3

There are 3/2 times as many flapjacks so each ingredient needs to be multiplied by 3/2. To multiply by a fraction: divide by the denominator then multiply the result by the numerator

butter 180 g

brown sugar 210 g

oats 375 g

syrup 3 tablespoons

(Total for Question 19 is 3 marks)

.CG Maths.

20 Ami and Josh use a calculator to work out $\dfrac{595}{4.08^2 + 5.3}$

Ami's answer is 27.1115
Josh's answer is 271.115

One of these answers is correct.

Use approximations to find out which answer is correct.

$\dfrac{600}{4^2 + 5}$ ← Rounding each number to 1 significant figure

$600 \div 20 = 030$ ← $4^2 = 4 \times 4 = 16$, then $16 + 5 = 21$, which is approximately 20. So dividing the 600 by 20 estimates the answer to be 30

Ami ← 27.1115 is close to 30 and 271.115 is not close to 30

(Total for Question 20 is 3 marks)

---

21 Work out $\dfrac{0.06 \times 0.0003}{0.01}$

Give your answer in standard form.

$\dfrac{6 \times 10^{-2} \times 3 \times 10^{-4}}{1 \times 10^{-2}}$ ← Converting all the numbers into standard form. For example, 0.06 is multiplied by ten 2 times to get 6 (which is at least 1 and less than 10) so it must be divided by ten 2 times to keep it equal, which is the same as multiplying by 10^{-2}

18×10^{-4} ← The integers and powers of ten can be dealt with separately. $6 \times 3 = 18$, then $18/1 = 18$. The 10^{-2} cancel out leaving 10^{-4}

Dividing the 18 by ten 1 time gives 1.8 (which is at least 1 and less than 10) so the power of ten must be multiplied by ten 1 time to keep it equal. $10^{-4} \times 10^{1} = 10^{-4+1} = 10^{-3}$

1.8×10^{-3}

(Total for Question 21 is 3 marks)

22 (a) Work out $\frac{2}{5} + \frac{1}{4}$

$\frac{8}{20} + \frac{5}{20}$ ← Multiplying both the numerator and denominator of the 1st fraction by 4 and multiplying both the numerator and denominator of the 2nd fraction by 5 makes both fractions have the same denominator of 20

The numerators can be added and the denominator stays the same →

$\frac{13}{20}$

(2)

(b) Write down the value of 2^{-3}

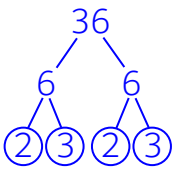
$2^3 = 2 \times 2 \times 2 = 8$. Then the negative power means to do the reciprocal (flip the fraction or do 1 over)

$\frac{1}{8}$

(1)

(Total for Question 22 is 3 marks)

23 Write 36 as a product of its prime factors.



← Doing a prime factor tree by splitting each number into two factors and stopping at prime numbers. 2 and 3 are prime as they are only divisible by themselves and 1

Writing each of the circled primes as a product →

$2 \times 2 \times 3 \times 3$

(Total for Question 23 is 2 marks)

24 Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77

Find the ratio of Jay's age to Kiaria's age to Martha's age.

$J + 7$ ← Let J be Jay's age. Kiaria must be J + 7

$2(J + 7)$ ← Expressing Martha's age in terms of J. Expanding the bracket gives 2J + 14

$J + J + 7 + 2J + 14$ ← Adding Jay's age, Kiaria's age and Martha's age all in terms of J to express the sum of their ages

$4J + 21 = 77$ ← Collecting like terms. J + J + 2J = 4J and 7 + 14 = 21. Setting equal to the value of the sum, 77

$4J = 56$ ← Subtracting 21 from both sides eliminates the +21 on the left and gets the J term on its own

$4\overline{)5\,{}^{1}6}$ (quotient 14) ← Dividing both sides by 4 eliminates the 4 on the left and finds that J = 14. So Jay is 14 years old

$14 + 7$ ← Kiaria is 7 years older than Jay. So Kiaria is 21 year old

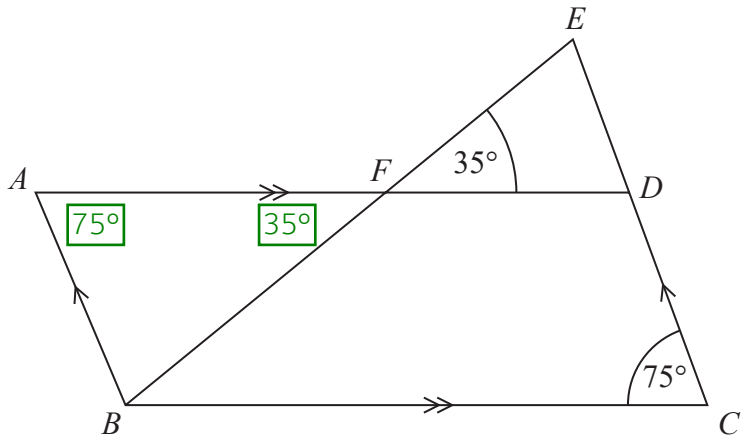
21×2 ← Martha is twice as old as Kiaria. So Martha is 42 years old

Writing their ages as a ratio. There is no need to simplify

14 : 21 : 42

(Total for Question 24 is 4 marks)

25



ABCD is a parallelogram.
EDC is a straight line.
F is the point on *AD* so that *BFE* is a straight line.

Angle *EFD* = 35°
Angle *DCB* = 75°

Show that angle *ABF* = 70°
Give a reason for each stage of your working.

Angle BAF = 75° as opposite angles in a parallelogram are equal

Angle BAF is opposite angle BCD in the parallelogram

Angle AFB = 35° as vertically opposite angles are equal

Angle AFB is vertically opposite to angle DFE

$$\begin{array}{r} 75 \\ +35 \\ \hline 110 \\ {\scriptstyle 1} \end{array}$$

← Adding angles BAF and AFB works out that there are 110° in the triangle ABF so far

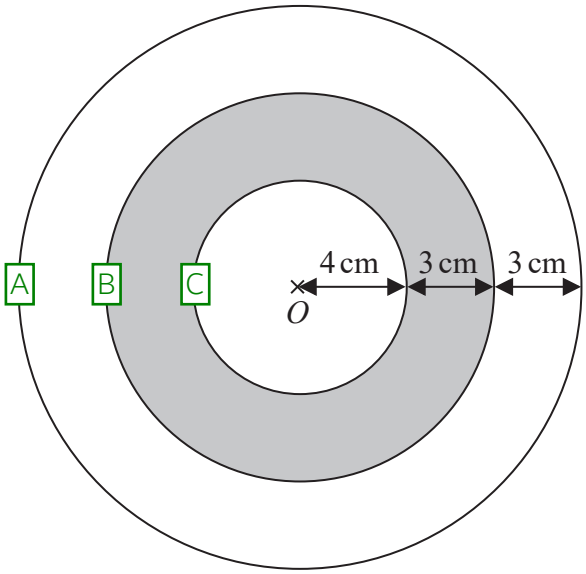
$$\begin{array}{r} 180 \\ -110 \\ \hline 70 \end{array}$$

← Subtracting this 110° from 180° leaves angle ABF

Angle ABF is 70° as there are 180° in a triangle

(Total for Question 25 is 4 marks)

26 The diagram shows a logo made from three circles.



Each circle has centre O.

Daisy says that exactly $\frac{1}{3}$ of the logo is shaded.

Is Daisy correct?
You must show all your working.

$\pi \times 10^2 = 100\pi$ ← This works out that the area of circle A is 100π cm^2, which is the area of the whole logo. Area of circle = $\pi \times$ radius^2. The radius of circle A is 4 + 3 + 3 = 10 cm

$\pi \times 7^2 = 49\pi$ ← This works out that the area of circle B is 49π cm^2. Area of circle = $\pi \times$ radius^2. The radius of circle B is 4 + 3 = 7 cm

$\pi \times 4^2 = 16\pi$ ← This works out that the area of circle C is 16π cm^2. Area of circle = $\pi \times$ radius^2. The radius of circle C is 4 cm

$49\pi - 16\pi$ ← Subtracting the area of circle C from the area of circle B works out that the shaded area is 33π cm^2

$\frac{33\pi}{100\pi} = \frac{33}{100}$ ← Expressing the shaded area as a fraction of the area of the whole logo. Simplifying by dividing both the numerator and denominator by π. It cannot go any simpler as 33 and 100 are not divisible by the same whole numbers to get smaller whole numbers

No ← 33/100 is not exactly 1/3

(Total for Question 26 is 4 marks)

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£x)	Frequency	A	B
$150 < x \leqslant 250$	1	200	200
$250 < x \leqslant 350$	11	300	3300
$350 < x \leqslant 450$	5	400	2000
$450 < x \leqslant 550$	0	500	0
$550 < x \leqslant 650$	3	600	1800
			7300 ← C

(a) Work out an estimate for the mean of the weekly earnings.

A: Writing down the midpoint for each interval. Each interval is 100 wide and 100 ÷ 2 = 50. So adding 50 to the lower bound of each interval gives the midpoint.

B: Multiplying the midpoints by the frequencies for each interval estimates the total earnings for each interval.

C: Adding all the estimated totals estimates the overall total earnings of all of the people

$$20 \overline{)\,7\,{}^{7}3^{13}0^{10}0} = 365$$

← Dividing the estimated £7300 total by the 20 people estimates the mean

£ 365

(3)

Nadiya says,

"The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Nadiya?
You must justify your answer.

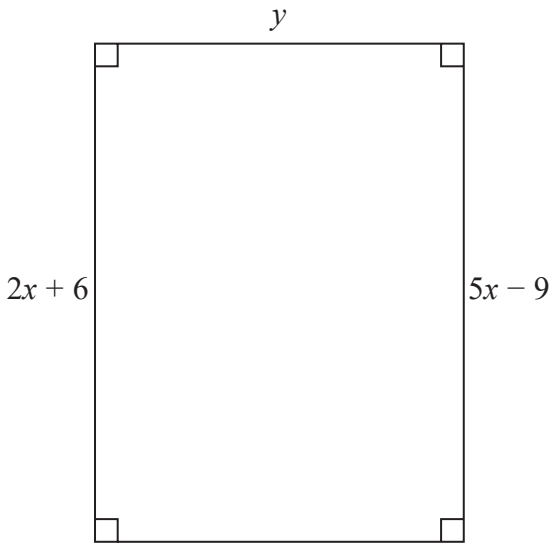
Yes as it is effected by outliers

Median is usually used for earnings as it excludes the outliers

(1)

(Total for Question 27 is 4 marks)

28 Here is a rectangle.



All measurements are in centimetres.

The area of the rectangle is 48 cm^2.

Show that $y = 3$

$2x + 6 = 5x - 9$ ← Opposite sides of a rectangle are equal. So setting the opposite sides involving x equal to each other

$6 = 3x - 9$ ← Subtract 2x from both sides to get all the x on the same side

$15 = 3x$ ← Adding 9 to both sides to get the x term on its own

$5 = x$ ← Dividing both sides by 3 gets x on its own

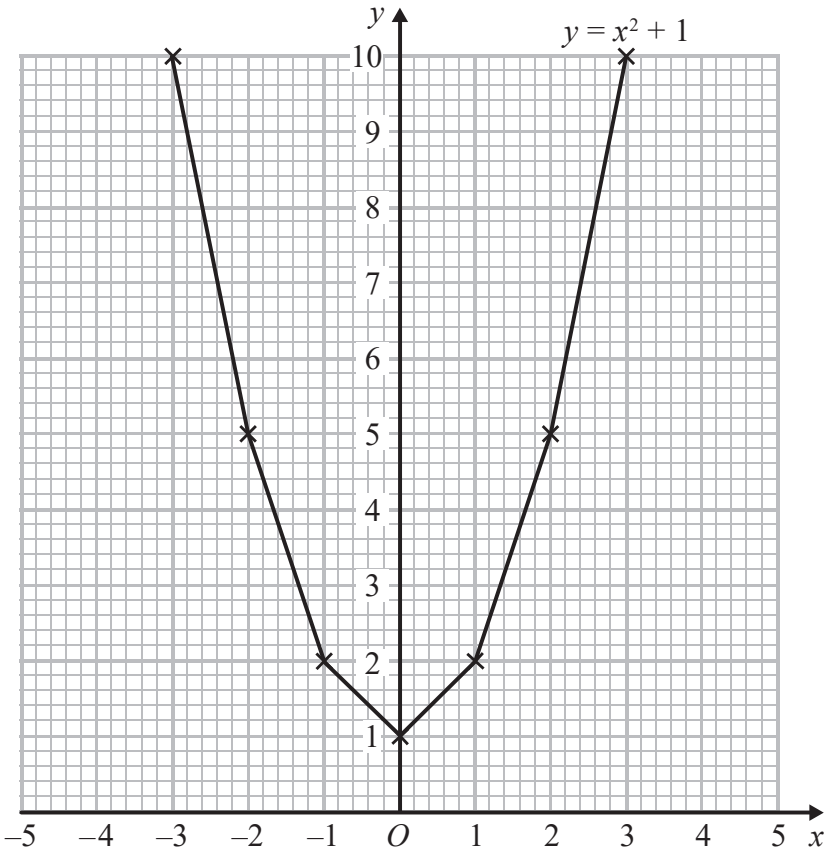
$2(5) + 6$ ← Substituting 5 for x in 2x + 6 finds that the length of the rectangle is 16 cm

$y = 48 \div 16 = 3$ ← Area of rectangle = length × width. So width = area of rectangle ÷ length

(Total for Question 28 is 4 marks)

29 Brogan needs to draw the graph of $y = x^2 + 1$

Here is her graph.



Write down one thing that is wrong with Brogan's graph.

Should be a curve

The points plotted are correct but the points between them are wrong

(Total for Question 29 is 1 mark)

30 In a sale, the normal price of a book is reduced by 30%.
The sale price of the book is £2.80

Work out the normal price of the book.

100 - 30 ← Subtracting the 30% from 100% works out that it has been reduced to 70% of the normal price

280 ÷ 70 = 28 ÷ 7 ← £2.80 is 280p. Dividing 280p by 70 works out that 1% of the normal price is 4p

4 × 100 ← Multiplying the value of 1% by 100 works out that 100% of the normal price is 400p

400p is £4

£ 4

(Total for Question 30 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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